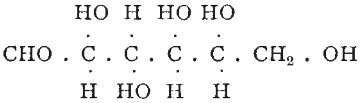
as *d*-glucose, it is evident that the chemist and physicist, the physiologist, the analyst and the technologist concerned with fermentation industries are all catered for by the author, and in such a way that there should be very little difficulty in finding out what is known concerning any particular sugar or carbohydrate from the special point of view from which the reader consults the volume.

There are a few other points to which attention may be directed. The systematising of the nomenclature, so as to bring the latter into harmony with the stereochemical formulæ, is more complete than has hitherto been attempted in any work dealing with this class of compounds. The numerical system of indicating position in the space-formula is certainly to be commended. We give a couple of examples to illustrate the value of the method:—

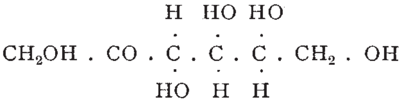
d-Glucose.



$$\text{CHO} . \overset{\text{HO}}{\underset{\text{H}}{\text{C}}} . \overset{\text{H}}{\underset{\text{HO}}{\text{C}}} . \overset{\text{HO}}{\underset{\text{H}}{\text{C}}} . \overset{\text{HO}}{\underset{\text{H}}{\text{C}}} . \text{CH}_2 . \text{OH}$$

Hexanepentolal $\frac{2.4.5}{3}$ 6

d-Fructose.



$$\text{CH}_2\text{OH} . \text{CO} . \overset{\text{H}}{\underset{\text{HO}}{\text{C}}} . \overset{\text{HO}}{\underset{\text{H}}{\text{C}}} . \overset{\text{HO}}{\underset{\text{H}}{\text{C}}} . \text{CH}_2 . \text{OH}$$

Hexanepentol – 1 $\frac{4.5}{3}$ 6-one-2

Another point which those who have occasion to consult such works will appreciate, is the distribution of the references to original papers among the text, instead of relegating them to footnotes, or, worse still, to the end of the book. Some readers may not agree with this view, but it has been impossible, in writing this notice, to avoid comparing M. Maquenne's volume with a somewhat similar work at present in existence, viz. the "Kurzes Handbuch der Kohlenhydrate," by Dr. Tollens, the first volume of which was published in 1888, and the second in 1895. In the German work the references consist of densely-packed and absolutely bewildering series of pages at the end of the volume, so that in hunting up a reference the reader must turn from the page which he is reading and wade through the serried ranks of numbered references till he finds the one he wants, by which time he will have, no doubt, mislaid the paragraph from which he set out. In making use of such works as the one under consideration, in which the authority for every statement is referred to, it is certainly more convenient to have the references in brackets immediately under the notice of the reader. If the references are not wanted, the reader has only to pass on to the end of the bracket, and begin the following sentence.

This comparison of the French and German works brings out another point, however, in which Dr. Tollens will be found to have the advantage. The complex polyoses, such as starch and cellulose, are treated of much less completely by the French than by the German author, so that in this division Dr. Tollens's book will take precedence as a work of reference. In fact, M. Maquenne refers his readers to the German work for more complete information on these subjects. The other standard German authority on this subject, "Die Chemie der Zuckerarten," by E. O. v. Lippmann (1895), will find a serious rival in the present work.

In favourably recommending this latest contribution to the chemical literature of the carbohydrates to the attention of English chemists as a work of the greatest value to the general student, and as indispensable to the specialist; we have only to utter the caution—perhaps somewhat unnecessarily,—that M. Maquenne does not profess to deal with his subject from the technological point of view. It may prevent disappointment if we point out that the manufacturer who is seeking for information concerning construction of plant, processes of extraction, refining, and so forth, will have to look elsewhere for guidance. Of the general value of the present volume as a literary production, we have only to say that the information given is complete, accurate, and up to date. The only omission that we have been enabled to detect relates to *d*-mannose, of which the author says (p. 559):—

> "Malgré ses rapports avec celle-ci [*d*-mannite] et ses analogies de constitution avec le glucose et le lévulose, il ne parait exister chez les plantes, comme le galactose, qu'à l'état de *mannosides* complexes," &c.

The occurrence of free mannose in plants is, therefore, not recognised by M. Maquenne. Nevertheless, Messrs. Tsukamoto, Tsuji, and Kinoshita are said to have extracted this sugar from the stalks of the Japanese *Amorphophallus konjak*, and Messrs. Flatau and Labbé have recently announced that the sugar contained in orange peel is mannose.[1] The author may have overlooked these statements, or he may not accept them; at any rate, it seems worth while calling attention to the omission.

R. MELDOLA.

A NEW BOOK ON MAN.

The Races of Man: an Outline of Anthropology and Ethnography. By J. Deniker. With 176 illustrations and two maps. Pp. 611. (London: Walter Scott, Ltd., 1900).

THE Contemporary Science Series has been enriched by the addition of this very valuable work on general anthropology by Dr. J. Deniker, the distinguished Chief Librarian of the Museum of Natural History in Paris, who is well known for his original contributions to that science. Dr. Deniker has read widely, and at various times has systematised the writings of others. These are necessary qualifications for the writer of a general survey of the science of man; but in addition, our author has made investigations in various departments of physical anthropology which give a precision to his treatment, and this element of first-hand knowledge causes the reader to feel more reliance on his judgment than might otherwise have been the case.

The book is fairly evenly divided between a summary of the scope of physical anthropology and ethnography, and a systematic account of races and peoples. The former section deals with somatic characters, such as the distinctive characters of man and apes, the morphological characters of human races, and their physiological and psychological characters. The chapters on the social life of men are prefaced by a useful classification of states of civilisation. One chapter is devoted to the various methods of the exchange of ideas, and others deal with the factors of material life, such as food, fire, pottery and habitations; in the latter section, the author draws attention to the essential distinction between fixed and removable dwellings. The view is adopted that, in warm climates, vanity begot ornaments which became transformed little by little into dress.

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[1] *Bull. Soc. Chim.* [3] xix. 408.

The chapter on the psychic life alludes to games and recreations, fine arts, religion, myths and science. Finally, there is one chapter devoted to family life, and another to social life.

With such a wide field to cover, the accounts of the multitudinous aspects of human life must of necessity be brief; but the author has maintained an admirable perspective, and his descriptions are written clearly and tersely, with no attempt at "fine writing." As Dr. Deniker gives copious references, the reader will have no difficulty in finding fuller information on any particular subject, and his hope that "even professional anthropologists" will be able to consult his works profitably is well founded; the tables of measurements and indices are in this respect particularly useful. The book is well illustrated, the racial types being very carefully chosen. The introduction of more maps illustrating the distribution of the principal groups would have increased the value of the book.

It is impossible in a book of this nature to avoid slips of various kinds. For example, on p. 65, in the explanation of Fig. 13, K is twice printed for X; Bornea is printed for Borneo, pp. 486, 487; and there are a few other obvious misprints. On dealing with the question of anthropophagy (p. 147), it should be noted that the abandonment of cannibalism by the Fijians is very recent, and that was due to the pressure brought to bear on them by Europeans; the same applies to several tribes in New Guinea, but in others the practice still continues. The fire-syringe (p. 150) is known in Java, and the sawing method of making fire in New Guinea. The fish-hook ornament of Torres Straits (p. 204) was made of tortoiseshell, not of mother-o'-pearl. Flinders Petrie has for some time abandoned the view that the "new race" was of Libyan origin, and has shown that these people were the neolithic ancestors of the Egyptians (footnote, p. 429).

It is scarcely fair to charge Dr. A. B. Meyer (footnote, p. 483) with supporting the Negrito origin of the Kalangs of Java, as in his original paper in 1877 he did so "with a certain reservation," and he candidly admitted his mistake in his fine monograph on the Negritos in 1893. Although Dr. Deniker is usually so careful in his references, he has omitted to refer the reader to any of Dr. Meyer's valuable publications, with the exception of this unfortunate instance.

Like most anthropologists, Dr. Deniker employs the term Dyak to signify a native of Borneo. Since the publication of Ling Roth's book on "The Natives of Sarawak," there is little excuse for employing that term in an ambiguous manner, unless, of course, an author, who may be quoted, gives no more precise information. The Land Dayaks inhabit the original Sarawak territory. The Sea Dayaks are a very different people, and equally distinct are the extensive groups of Kenyahs, Punans, Muruts, &c.; but, as no precise anthropometrical data were available when the book was written, it is unreasonable to expect a thorough disentangling of the complex of peoples in this large island. Suffice it to say, that a pronounced dolichocephalic element is present, which is probably that recognised by Dr. Deniker as Indonesian.

Dr. Deniker states (p. 486):—

> "It is even possible that the Malays are a mixed nation, sprung from the intermixture of Indonesians with various Burmese, Negrito, Hindu, Chinese, Papuan, and other elements. In this case, the Indonesians would be the pure Malay type, the real proto-Malays."

It is probable that the "Malays" everywhere are a mixed people, and have a different composition in various localities, but our author appears to have overlooked what would be the probable effect of a mixture of most of these elements on the cephalic index of his proto-Malays. He states that the Indonesians have a cephalic index of 78·5 while the Malays have an index of 85. The Burmese index and that of the Aeta Negritos is somewhat less than this, while that of the Sakais is about 79. The Southern Chinese have an index of 81, and Hindus (*i.e.* Talugus or Klings) and the Papuans are markedly dolichocephalic. It is, then, difficult to see how the brachycephaly could have arisen; on p. 590 the presumably fairly pure Sumatran Malays are put down as 82·8, but though this lessens, it does not do away with this difficulty.

There is no particular reason for the surprise of M. Sénart (p. 404) at Brahmans offering water to travellers at railway stations; a high caste Hindu could not receive water from one of low caste, and by the simple expedient of avoiding absolute contact of person or vessel no contamination is received from giving water to low caste Hindus.

The Kolarians (p. 408) have a tradition that they came from the North-east, and they may be the remains of one of the various migrations which have assisted towards forming the complex population of India. This does not necessarily imply that they have a Mongolian strain. Sir William Turner has recently[1] investigated the craniology of the Hill Tribes of the North-east Frontier, and he identifies a dolichocephalic, non-Mongolian element, which appears to the present writer to be akin to the Indonesian stock. Some authorities regard the true Dravidians as the more or less modified relics of another, and possibly later, migration from the North-west, which partially replaced and submerged the Kolarian stock.

A special feature in the book is the classification of the peoples of Europe. He recognises: (1) a Northern Race (fair, dolichocephalic, very tall); (2) an Eastern Race (fair, sub-brachycephalic, short); (3) an Ibero-Insular Race (dark, dolichocephalic, short); (4) a Western or Cevenole Race (dark, very brachycephalic, short); (5) a Littoral or Atlanto-Mediterranean Race (dark, mesocephalic, tall); (6) an Adriatic or Dinaric Race (dark, brachycephalic, tall), and several sub-races. The first, third, and fourth of these races are commonly accepted, and there will probably be some discussion concerning the other three; but those who are interested in this subject will have to study the series of memoirs on "Les Races de l'Europe," by Dr. Deniker, of which the first instalment on the cephalic index has been published by l'Association Française pour l'Avancement des Sciences (26e Session, 1897), 1899. In the volume under review there are, owing to the necessary limits of space, insufficient data to profitably discuss the author's position. It is evident that Dr. Deniker has published the conclusions which he has already arrived at from a study of the large amount of facts he has accumulated, and of which one valuable section has alone yet been published. Unfortunately, many anthropological terms are insufficiently fixed, and all authors are not careful to promote uniformity of definition—the term "race" is a case in point—and our author admits of more races in Europe than do other anthropologists; indeed, in his treatment of European ethnography he is more analytic than synthetic.

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[1] "Contributions to the Craniology of the People of the Empire of India. Part I." *Trans.* Roy. Soc. Edinb. xxxix. 1899, pp. 703.

It is always easy to criticise; especially does a book like this lend itself to captious reviewing; but it is not every one who could write so sound and clear a summary of the scattered information that has been accumulated on an intricate subject. A. C. HADDON.

SYSTEMATIC BACTERIOLOGY.

System der Bakterien. Von Dr. W. Migula. Zweiter Band, Specielle Systematik der Bakterien. Pp. x + 1068 + xviii Plates. (Jena: Gustav Fischer, 1900.)

THIS volume is the second part of a work, of which the first part was reviewed in this journal in June 1898. It was then pointed out how meritorious was this undertaking of Prof. Migula, well known by his researches into the morphology of bacteria and allied organisms, in attempting to scientifically group the enormous number of forms of bacteria that had been discovered and described. No better index for the great difficulties of classifying bacteria in a scientific manner need be adduced than the fact that bacteriology within the last fifteen or twenty years has advanced by leaps and bounds, and that a host of workers—botanists, chemists, and last, but not least, pathologists—have been busy in discovering new forms, and describing and classifying them in any but a scientific manner, and on principles widely differing according to the actual point of view of the individual observers.

To classify and systematise on scientific principles, such as obtain in other departments of natural history, is a task which demands an enormous amount of labour and a comprehensive knowledge, which few observers would be willing to spare or able to command. Prof. Migula is to be congratulated on having, with his thorough grasp of this new and ever-widening field of research, and with a truly prodigious industry, achieved this result in as thorough a manner as can be expected in a branch of natural history so new and so growing as systematic bacteriology.

It will be remembered that in the first volume bacteria were considered in a general way as to their morphology and activity, and by these studies the endless number of bacterial species received their proper and scientific allocation. Thus the bacteria, as a "class," were arranged in two great groups or "orders," viz.: (1) Eubacteria, free of sulfurgranules and bacteriopurpurin, and (2) Thiobacteria, including sulfurgranules, and their protoplasm either colourless or coloured by bacteriopurpurin (pink, red or violet).

The "order" of Eubacteria comprises four "families": (*a*) Coccaceæ, cells spherical; (*b*) Bacteriaceæ, cells rod-shaped or cylindrical; (*c*) Spirillaceæ, cells more or less curved and spiral; (*d*) Chlamydobacteriaceæ, cells cylindrical, arranged in threads surrounded by a common sheath.

The first family, Coccaceæ, comprises five "genera," viz.: genus 1, Streptococcus or Chaincocci; genus 2, Micrococcus; genus 3, Sarcina; genus 4, Planococcus; genus 5, Planosarcina.

Genus Streptococcus comprises 50 different known species; genus Micrococcus comprises 228; genus Sarcina comprises 55; genus Planococcus, 7; and genus Planosarcina three distinct known species.

The second family, Bacteriaceæ, is divided into three genera, viz.: genus 1, Bacterium, without flagella, comprising 302 different species; genus 2, Bacillus, flagella more or less over the whole body, comprising 452 species; and genus 3, Pseudomonas, flagella only at the ends, comprising 79 different species.

The third family, Spirillaceæ, is divided into four genera, viz.: genus 1, Spirosoma, with 7 species; genus 2, Microspira, with 68; genus 3, Spirilla, with 16; and genus 4, Spirochæta, with five different species. These three families are minutely dealt with in 1030 pages; the whole of the fourth family of Chlamydobacteriaceæ, with its four genera and nine species, and the whole of the second "order" of Thiobacteria, with its two families (five genera), and comprising twelve species, altogether receive only twenty pages, so that practically the volume is devoted to a description of Coccaceæ, Bacteriaceæ and Spirillaceæ.

In looking over the description of the 1272 species belonging to these three families, and while admiring the prodigious labour, one cannot help sympathising with the author in the difficulties to determine which is, and which is not, a true species; which is, or is not, merely a variety; so much so that it seems as if in distinguishing "species" from "varieties," and *vice versa*, a certain arbitrary plan had to be followed. For, in some instances, the distinction between one "true" species and another is based chiefly on very slight cultural differences in one or the other artificial medium; in others on minute details of artificial staining, or on slight differences in size on one or the other artificial mediums; or even slight shades of natural colouring on a particular medium, or slight differences in physiological action. That is to say, numerous instances occur where one or the other of these points is used for distinguishing one species from another, and other equally conspicuous instances occur where these differences only suffice to mark off a "variety." One example will suffice to illustrate this difficulty. In the genus Streptococcus, the first species dealt with is that of "Streptococcus pyogenes" of Rosenbach; to this "species" the author assigns as